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An Evaluation of Multisystemic Therapy with Australian Families

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This study aims to evaluate the effectiveness of the Multisystemic Therapy (MST) intervention for Australian families invloved with the Specialist Child and Adolescent Mental Health Service (CAMHS). This program was implemented within the Western Australian Department of Health in 2005, and has continually operated two small clinical teams within the Perth metropolitan area since then. This intervention was specifically chosen to improve service access, engagement, and intervention with vulnerable families having young persons with a history of significant and enduring behavioural problems. The study reports on data collected from July 2007 to July 2013 which includes baseline, post-treatment, 6-month, and 12-month follow-up. There were 153 MST families participating in the research at all time points (71% male; 11% Australian Aboriginal; average youth age was 13.6 years). Caregivers completed a set of questionnaires including Child Behaviour Checklist, Parenting Styles and Dimensions Questionnaire, and Depression, Anxiety and Stress Scale. One-way repeated measure ANOVA were used to measure changes over time. Significant caregiver-reported improvements in all measures were reported at post-treatment, and most improvements were maintained at the follow-up periods of 6 and 12 months post-intervention. These preliminary outcomes demonstrate that the 4–5 month MST intervention significantly reduces behavioural problems and emotional difficulties in young Australians and these improvements are generally maintained by caregivers over time. Primary caregivers reported improved skills and mental health functioning that were also maintained over the follow-up period. A proposed randomised controlled trial of the program will address potential placebo and selection bias effects.

Keywords: conduct disorder, disruptive behaviours, multi-systemic therapy, effectiveness, child and adolescent mental health

Key Points

1 Multi systemic therapy (MST) is an intensive, home-based, family intervention for addressing significant emotional and behavioural problems in older children and young adolescents.
2 MST is a widely disseminated evidence-based intervention for antisocial or disruptive behaviours in youths aged 12 to 16 years, with the intervention successfully implemented in more than 30 states of the United States of America, and in at least 12 other nations including Australia and New Zealand.
3 The preliminary outcomes from this study demonstrate that MST can significantly improve emotional and behavioural problems in young Australian persons, and substantially improve primary caregiver parenting skills and mental health functioning.
4 This Australian study of the effectiveness of the MST intervention, when utilised in a Western Australian mental health setting, reports findings consistent with those of most randomised controlled trials of MST previously reported in international research.
5 A future randomised controlled trial of the effectiveness of the intervention with an Australian population would address potential placebo and selection bias effects.

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Introduction

Community debate surrounding the ways to address juvenile antisocial behaviour, as well as the allocation of public resources to this cause, has been an ongoing concern for consecutive federal governments, state governments, and community-managed organisations. Policy formulation as well as intervention and program development has tended to emerge separately within various state government departments and agencies (Health, Justice, Education, the Alcohol and Other Drug sector, Child Protection & Family Services, and Community Development). These programs seek reductions in juvenile crime, drug and alcohol use, violence and aggression, homelessness, parenting difficulties, children at risk, and mental illness/suicide in young people. Many 'at risk' young people targeted in these programs often demonstrate evidence co-morbidity of issues and health concerns (Feital, Margetson, Chamas, & Lipman, 1992).

Defiant behaviour in young people refers to a range of actions that infer some form of rule violation, and to some degree can be seen as a normal expression of behaviour emerging in adolescence and consequential to the attainment of developmental milestones. Research on delinquency, conduct disorder, antisocial behaviour, and substance abuse in young people has suggested such behaviours are influenced not only by individual characteristics (such as attributional bias and antisocial attitudes), but also factors emerging from the social systems in which the persons are involved (Cunningham & Henggeler, 2001; Kazdin, 2002). These systemic factors include family/carer characteristics (low warmth, high conflict, discipline strategies); association with antisocial peers, low school retention and performance, and specific community influences (low socioeconomic areas and local criminal subculture).

Without effective intervention, conduct disorders often predict various poor adult outcomes, including a large variety of adult mental illness (Kim-Cohen, Caspi, Moffitt, Harrington, Milne, & Poulton, 2003), substance use ('Editorial: Psychiatric predictors of adolescent and young adult drug use and abuse: What have we learned?,' 2007; Fergusson, Horwood, & Ridder, 2007), and other long-lasting adult difficulties such as unemployment (Richards & Abbott, 2009). Many of these difficulties are very high cost to the community, especially juvenile detention, chronic mental illness and unemployment, substance abuse and adult incarceration.

There is a strong association between conduct disorder prevalence and socioeconomic standing, with much higher rates of conduct disorder in poorer families (National Institute for Health and Clinical Excellence, 2013). Despite the increased prevalence of behavioural problems in vulnerable Western Australian families (including Australian Aboriginal families), these families typically have low rates of engagement with clinic-based mental health services. It has been suggested these low rates of service engagement with vulnerable populations has various contributing reasons including limited transport options for families living in outer metropolitan suburbs, inflexible service delivery by mental health clinics, and service avoidance due to the stigma of mental illness (Department of Health Western Australia, 2015).

Effective and reliable engagement with these families is important to help stop conduct disorders escalating to family violence, school expulsion, substance use, homelessness, crime involvement, followed by police involvement and juvenile detention. However effective engagement with high-risk families typically requires highly flexible outreach intervention, which isn't how mental health services are generally

designed as most child and adolescent mental health services are clinic or hospital-based. Given the reported high prevalence of conduct disorders they typically have very low service rates by various agencies including child and adolescent mental health services. However, without effective engagement and intervention with this population, many young persons' behaviour escalates until they come to the attention of the Police and Justice Services. Western Australia currently has the highest rate of juvenile detention of the Australia states, especially for Australian Aboriginals (Richards, 2011), and shares high rates of recidivism with other states.

Previous research suggests that behavioural problems of youths and their families are not only seen in the family setting, but also extend to other settings such as school, peer group, and community (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998; Schoenwald, Brown, & Henggeler, 2000a). Thus there is increasing recognition of the need and value of evidence-based interventions that address adolescents' conduct behaviours in multiple settings or systems. A multiple systems or multi-modal intervention has consequently become recognised as the preferred approach when targeting adolescents with serious conduct problems, or juvenile delinquency. A multiple systems approach emphasises the interaction between adolescent psychopathology and the role of the multiple systems in which the adolescent is embedded, such as the family, school, peer group, local neighbourhood, and community systems (Adamson, Campbell, & Kress, 2015; Henggeler & Schaeffer, 2010).

Multisystemic Therapy

Multisystemic Therapy (MST) was developed in the United States in the late 1970s to provide intensive family and community-based treatment incorporating multiple determinants of serious anti-social behaviour in young adolescents. The program is based on a social ecological understanding of human behaviour, emphasising that human development evolves from a complex interaction between individuals and the systems of which they are a part (Henggeler & Borduin, 1990). MST focuses on identifying aspects of the system in which a young person is embedded, and that when altered, increase the probability of reducing antisocial behaviour. MST interventions are evidence-based, utilising a range of empirically validated treatments that include cognitive behaviour therapy, parental skills training, and structural family therapy, whilst drawing on family systems theory (Minuchin, 1974) and social ecological theories of behaviour (Bronfenbrenner, 1979). Treatment is based on the scientist-practitioner model, with therapists assessing families and related systems, and formulating and testing hypotheses most likely to change specific antisocial behaviour and the systems that promote this behaviour. The program is highly intensive, with a therapist having a concurrent caseload of only four to six families whom they typically visit three times each week in the family home whilst receiving considerable training and supervision. This assessment and intensive treatment is mostly client home-based, or operating within the context of local resources, such as schools and youth services.

The MST intervention normally lasts 4–6 months, with clinicians available 24 hours 7 days per week to all active clients. The after-hours telephone support provided to families is designed to support parents and carers in predictable times of family disruption and distress early in the intervention. The primary therapy goals are initially established by the family and typically involve reducing aggression, violence, and non-compliance in the home. Other common family goals involve improved

school attendance and behaviour, cessation of substance use, and anti-social peer involvement. The MST intervention is guided by nine treatment principles that shape the assessment and intervention process (Schoenwald et al., 2000a). There are nine principles of MST (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009):

1. Finding the fit between the identified problems and their broader systemic context.
2. Positive and strength focused.
3. Increasing responsibility among family members.
4. Present-focused, action-oriented, and targeting specific and well-defined problems.
5. Targeting sequences of behaviour within and between multiple systems.
6. Developmentally appropriate and fit the developmental needs of the youths.
7. Continuous effort by family members.
8. Evaluation and accountability.
9. Promoting treatment generalisation and long-term maintenance of therapeutic change.

A substantial body of research indicates that clinician adherence to the program's nine principles better predicts long-term reductions in the number of youth arrests, the number of days incarcerated, substance use, aggression and other antisocial behaviour problems, and general improvements in family functioning (Henggeler, Melton, Brondino, Scherer, & Hanley, 1997; Henggeler, Pickrel, & Brondino, 1999; Huey, Henggeler, Brondino, & Pickrel, 2000; Schoenwald, Henggeler, Brondino, & Rowland, 2000b).

Implementation of MST in Western Australia

Arising from a review on vulnerable children and adolescents' mental health needs, the Western Australian (WA) Office of Mental Health embraced a 'whole of government' approach to addressing the needs of antisocial young persons. This approach incorporated the Western Australian Department of Health as the primary stakeholder in the implementation of an innovative systemic intervention program.

Considerable consultation and collaboration across several Western Australian government departments resulted in the decision to implement MST as the preferred intervention to help better access an identified high-risk population. Two small MST clinical teams were established by the Department of Health in late 2005 and have since been continuously operating in the outer metropolitan areas of the capital city (Perth). Each clinical team is comprised of a part-time clerical officer, four full-time allied health clinicians, and a clinical supervisor (most often clinical positions are filled by clinical psychologists). Due to the intensive nature of this family intervention, clinicians have small caseloads of four to six concurrent families. The clinicians are provided with weekly group supervision and consultation to ensure efforts are being efficiently directed where required for change in family communication, functioning, and the young person's behaviour. In addition, model fidelity is continually monitored and evaluated by caregiver feedback obtained via use of a monthly semi-structured telephone interview called the Therapist Adherence Measure (TAM). In recent years the TAM scores of the two Perth teams have consistently rated very highly, indicating the intervention is being consistently implemented with a high degree of model fidelity.

The primary goal of the standard MST intervention is to reduce antisocial and aggressive behaviours in young persons. The program focuses on working collaboratively with the youth's family, school, community, and other agencies providing services to the family, to address these issues. A key strategy is to empower primary caregivers with appropriate skills and resources to independently address the difficulties that arise in raising youth with behavioural problems, and to empower youth to more effectively cope with family, peer, school, and neighbourhood difficulties (Schoenwald et al., 2000a).

MST Program Target Population

The Western Australian Department of Health MST program receives referrals from various sources including several state government departments (e.g., Department of Education and Training, Department for Child Protection and Family Services, Department of Justice, the Police, and Child and Adolescent Mental Health Services within the Department of Health). Referrals are also received from private sector professionals (e.g., private psychology practices, paediatricians, general medical practitioners, and non-government school psychological services), and from various community-managed social service organisations.

To maintain close working relationships with major stakeholders, the program was established with a number of committees containing senior mental health professional representatives from those government departments who represent primary referral sources. One of these committees is called the referral review committee (RRC) and meets monthly to determine referral suitability. All referrals are considered against standard program selection criteria, then prioritised for immediate selection according to behaviour severity and number of vacancies on the two teams.

The standard MST selection criteria include:

1. Age range between 12 - 16 years; however, youths who are 10–11 years and 17 years are considered on a case-by-case basis (if very severe).
2. Severe and complex externalising mental health problem that has persisted for at least 12 months.
3. At risk of out-of-home placement or placement in a more restrictive setting.
4. Involved or at high risk of involvement in juvenile justice system.
5. At risk of exclusion from school.
6. Longstanding peer relationship problems – social isolation, membership of inappropriate peer group, or inappropriate boundaries with peers.
7. Involved in substance abuse.

Cases are not excluded from selection because of poor prognosis for success; but are chosen based on suitability and symptom severity. There are four standard criteria that suggest non-suitability for MST:

1. Youth living independently, or youth for whom a primary caregiver can't be identified despite extensive efforts to locate extended family, adult friends, or potential surrogate care givers.
2. Youth with a current/recent history of high-risk suicidal, homicidal, or psychotic behaviours.

3. Juvenile sex offenders (sex offending in the absence of delinquent or anti-social behaviour).
4. Youths with Pervasive Developmental Disorders (PDD) such as Autism.

Method

Participants

The study reports on complete longitudinal data collections from July 2007 to July 2013. A complete data set includes baseline, post-treatment, 6-month and 12-month follow-up data. After program activation, MST families were invited to participate in the research. If they agreed to participate in the study, an informed consent form was signed. Sixty-four percent of MST families agreed to participate in the research at baseline. At post-treatment, 76% of the original sample remained in the research, 61% at 6-month follow-up, and 46% at 12-month follow-up (see Figure 1).

Measures

Various measures completed by caregivers at the different data collection time points of baseline, post-treatment, 6-month, and 12-month follow-up, include:

Child Behaviour Checklist (*CBCL*) is reported by caregivers and used to assess a child's problem behaviours and competencies. It is a measure of externalising and internalising behaviours with high validity, and is often used to monitor changes in a child's behaviour over time. Cut-off scores (T-scores > 63) were utilised in the study to classify children as high or low risk of behaviour problems. The internal reliability

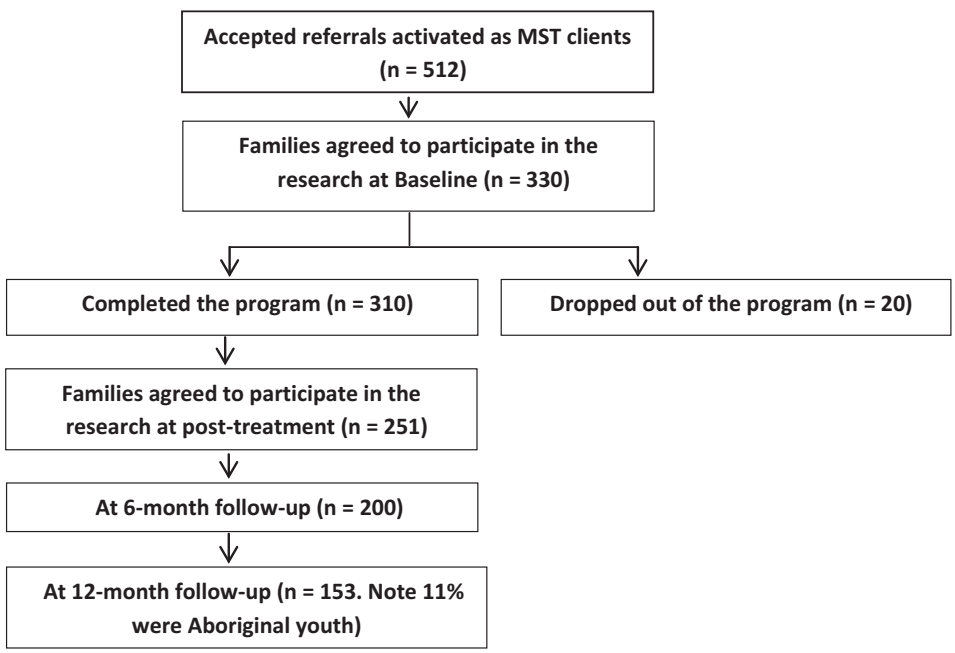

FIGURE 1

Flow of participants through the study (July 2006 – July 2013)

(Chronbach's alpha) of the total empirically based problem scales has been found to be .97 with the alphas of each scale ranging from .79 to .97 (Achenbach & Rescorla, 1983).

Parenting Styles and Dimensions Questionnaire (*PSDQ*) is reported by caregivers (Robinson, Mandleco, Olsen, & Hart, 2001) and used to measure parenting styles along a continuum based on Baumrind (1989). The PSDQ contains 32 statements describing different parent reactions to a child's behaviour. It has a 5-point scale ranging from 'never' to 'always' to evaluate the frequency of certain parenting strategies and reactions. The statements cover three dimensions of authoritative parenting (connection, regulation, and autonomy) with internal consistency of .86, three dimensions of authoritarian parenting (physical coercion, verbal hostility, and non-reasoning/punitive) with internal consistency of .82, and one dimension of permissive parenting (indulgence) with internal consistency of .64. The decreased scores of authoritarian and permissive parenting styles over a period of time indicate improvement in a caregiver's parenting strategy. Conversely, increased scores of authoritative parenting style over a period of time imply improvement in a caregiver's parenting strategy.

Depression, Anxiety and Stress Scale-21 (*DASS-21*) is reported by caregivers and is a set of three self-report subscales designed to measure the negative emotional states of depression, anxiety, and stress (Lovibond & Lovibond, 1995). It was constructed to extend the process of defining, understanding, and measuring the ever-present and clinically significant emotional states usually described as depression, anxiety, and stress. DASS-21 used for the purpose of this research is an abbreviated version with three subscales (depression, anxiety, and stress) of seven items each. The reliability (α-value) for the standardised 7-item scales is 0.81 for depression, 0.73 for anxiety, and 0.81 for stress. The score for each subscale is determined by totalling the scores of the seven corresponding items and multiplying it by two. This score is in turn used to determine the level of severity of the caregiver's depression, anxiety, and stress. The level of severity is categorised into normal, mild, moderate, severe, or extremely severe. A decrease in subscale score(s) over a period of time indicates improvement in the caregiver's mental health.

Statistical analysis

Data were analysed using statistic software SPSS Version 22. One-way repeated measures ANOVA were used to investigate the long-term impact of the MST treatment on the behaviour of MST research participants. Analyses were performed only to outputs from families who completed data sets across all time points.

Assumption testings for normality, homogeneity of variance, and sphericity were conducted at the beginning of analysis. Mauchly's test was used for assessing the severity of departures from sphericity in one-way repeated-measures ANOVA. A statistical significance in Mauchly's test indicated that there were significant differences between the variances of differences and, therefore, the assumption of sphericity had been violated for the main effects (Coakes, 2013). As a result, we evaluated the obtained F-ratio using new degree of freedom, which are calculated using the less conservative correction called Huynh-Feldt Epsilon (Allen & Bennett, 2008; Field, 2009).

All time points were compared with scores at post-treatment. A significant difference existing between baseline and post-treatment indicated an improvement on the behaviour of MST research participants. If positive outcomes are maintained there

should not be a significant difference between post-treatment and follow-up scores. Partial Eta Squared (η^2_p) is a measure of effect size from the main ANOVA which could be obtained from SPSS output (as reported in the Tests of within-Subjects Effects table). However, Tabachnick and Fidell (2007) advise against using η^2_p as a measure of effect size when the sphericity assumption has been violated. Instead, they propose calculating a lower-bound estimate of Eta Squared (η^2_L), using the following formula (Allen & Bennett, 2008):

$$\eta^2 L = \mathrm{SS_A}/(\mathrm{SS_A} + \mathrm{SS_S} + \mathrm{SS_{AS}})$$

It has been suggested that values of 0.01, 0.06, and 0.14 represent small, medium, and large effect respectively (Kirk, 1996). Field (2009) recommends that it would be more useful to also report effect size measures for focus comparison in addition to the main ANOVA. Therefore, we also calculated an effect size for its contrasts by which *F*-values were converted to *r*. An equation used for calculating is as follows:

$$r = \sqrt{F(1, df_R)/(F(1, df_R) + df_R}$$

Cohen (1988) reported the following intervals for r: 0.1 to 0.3: small effect; 0.3 to 0.5: intermediate effect; 0.5 and higher: strong effect.

Results

The average age of the 153 MST youths completing the 12-month follow-up was 13.6 years, of which the majority of youths were male (71%). Of the 153 client families, 11% identified as Australian Aboriginal. Data from CBCL, PSDQ, and DASS-21 were used to investigate the long-term impact of the intervention on the behaviour and functioning of participants. One hundred and fifty-three cases completed the CBCL, 146 cases completed the PSDQ, and 121 cases completed the DASS-21 at baseline, post-treatment, and six-month and 12-month follow-ups.

Long-term Effectiveness Findings

The Shapiro-Wilk and F_{max} statistics were used to test the assumptions of normality and homogeneity of variance respectively. Neither was violated. However, Mauchly's test indicated that the sphericity assumption was violated. Consequently, the Huynh-Feldt correction was employed. The results from the repeated measure ANOVA indicated that CBCL internalising problems, externalising problems, and total problems scores decreased significantly over time as follows: internalising problems, $F(2.76,419.01) = 61.10$, $p < .001$, $\eta^2_L = 0.182$; externalising problems, $F(2.75,418.52) = 98.13$, $p < .001$, $\eta^2_L = 0.313$; and total problems, $F(2.76,419.45) = 105.94$, $p < .001$, $\eta^2_L = 0.311$. Secondly, the parenting style scores had improved over time as follows; authoritative parenting style, $F(2.65, 383.52) = 13.04$. $p < .001$, $\eta^2_L = 0.052$; authoritarian parenting style, $F(2.67,387.20) = 56.10$, $p < .001$, $\eta^2_L = 0.207$; and permissive parenting style, $F(2.47,358.57) = 61.27$, $p < .001$, $\eta^2_L = 0.241$. This result means authoritative parenting increased, whereas authoritarian and permissive parenting decreased at post-treatment and was sustained at follow-ups. Lastly, the parental DASS had decreased over time as follows; depression, F(2.78,

333.23) = 30.79. $p < .001$, $\eta^2_L = 0.201$; anxiety F(2.73,327.17) = 19.25, $p < .001$, $\eta^2_L = 0.089$; and stress, F(2.85,341.57) = 43.10, $p < .001$, $\eta^2_L = 0.159$.

In addition, Tables 1, 2, and 3 indicate significant statistical differences between baseline and post-treatment scores on all measures. These significant score differences indicate positive outcomes are immediately apparent following the intervention. A series of pair-wise comparisons also revealed that the large majority of measures show no statistically significant differences between post-treatment scores and follow-up scores, indicating that improvements are maintained over time. Although a slightly negative change was found at follow-ups in some scores (i.e., permissive parenting style, and parental anxiety and stress), those scores were still significantly lower than their baseline scores. These outcomes indicate that positive outcomes obtained at post-treatment were generally maintained at 6-month and 12-month follow-up.

Discussion

Although MST is recognised as a preferred evidence-based intervention for antisocial youth in several countries (Butler, Baruch, Hickey, & Fonagy, 2011; Curtis, Ronan, Heiblum, & Crellin, 2009; Harpell, 2006; Henggeler, Melton, Smith, Schoenwald, & Hanley, 1993), the effectiveness of this intervention when operationalised within an Australian child and adolescent mental health service has not been evaluated. The primary aim of the present study was to examine the effectiveness of this intervention in improving Australian young persons' behaviours and emotional states. A second aim was to determine whether any positive changes gained by the end of the intervention would be sustained over the following year.

The majority of families who completed the program reported noticeable improvements in the overall behaviour and functioning of the young person. Specifically, they reported substantial decreases in both externalising problems and internalising problems by the end of treatment. Moreover, the results from the repeated measure analysis indicate that these improvements were sustained for at least 12 months following program completion. In addition, the results also show positive changes in the primary caregiver's parenting skills, and improvements in their own mental health. The resilience of these positive outcomes reflects the fact that the MST intervention places a strong focus on teaching primary caregivers improved communication skills, and effective techniques to manage anti-social behaviours and elicit pro-social behaviours in their children. The improved communication and problem-solving skills learnt by the primary caregivers are designed for generalisation and possible use with any other of their children having difficult behaviours; hence the intervention has the potential for powerful positive social influence and significant cost-saving potential for the wider community.

Families involved with the Western Australian Department of Health MST program are typically disadvantaged, with a range of complex and challenging issues. They commonly have a history of failed therapeutic interventions and/or minimal positive contact with mental health and other support services. These families include many Australian Aboriginal families, and culturally and linguistically diverse (CALD) families, and the program has slowly built a positive reputation with these populations over the last 10 years by successfully diverting young persons from school/home expulsion, and engagement with the Police and Justice Departments. A critical initial

TABLE 1
CBCL Outcome Measure: Summary of Long-term Results for MST Research Participants

	Time n = 153, raw scores: Mean (SD)				Estimated mean differences					
					Baseline to post-treatment		Post-treatment to 6-month follow-up		Post-treatment to 12-month follow-up	
CBCL	Baseline	Post-treatment	6-month follow-up	12-month follow-up	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90%CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)
Anxiety	10.05 (6.02)	6.78 (5.21)	6.24 (5.05)	6.16 (4.83)	3.27 (2.53 to 4.01) <.001	.58 (.49 to .65)	.55 (−.07 to 1.17) .082	.14 (.00 to .26)	.63 (−.12 to 1.37) .098	.13 (.00 to .26)
Withdrawn	6.56 (3.54)	4.38 (3.61)	4.32 (3.23)	4.54 (3.57)	2.18 (1.69 to 2.68) <.001	.58 (.48 to .65)	.06 (−.40 to .052) .801	.02 (.00 to .13)	−0.16 (−.67 to .35) .527	.05 (.00 to .18)
Somatic complaints	4.87 (4.36)	3.25 (3.63)	3.10 (3.50)	3.12 (3.68)	1.62 (1.11 to 2.14) <.001	.45 (.34 to .54)	.14 (−.34 to .63) .557	.05 (.00 to .18)	.13 (−.38 to .64) .612	.04 (.00 to .17)
Social problems	7.44 (3.99)	4.70 (3.47)	4.75 (3.64)	4.26 (3.35)	2.75 (2.22 to 3.27) <.001	.64 (.56 to .70)	−.05 (−.49 to .39) .815	.02 (.00 to .12)	.44 (.01 to .87) .045	.16 (.02 to .28)
Thought problems	6.74 (4.31)	4.22 (3.85)	4.10 (3.43)	4.22 (3.75)	2.52 (1.97 to 3.08) <.001	.59 (.50 to .66)	.12 (−.32 to .56) .597	.04 (.00 to .17)	−.07 (−.57 to .56) .982	.00 (.00 to .02)

(continued)

Table 1 *(continued)*

	Time n = 153, raw scores: Mean (SD)				Estimated mean differences					
					Baseline to post-treatment		Post-treatment to 6-month follow-up		Post-treatment to 12-month follow-up	
CBCL	Baseline	Post-treatment	6-month follow-up	12-month follow-up	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90%CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)
Attention problems	11.29 (3.71)	8.14 (4.02)	8.01 (4.08)	7.44 (3.97)	3.16 (2.57 to 3.74) <0.001	.65 (.57 to .71)	0.13 (−.41 to .67) .632	.04 (.00 to .16)	.70 (.13 to 1.27) .016	.19 (.06 to .31)
Rule-breaking behaviour	15.61 (5.85)	10.07 (6.01)	10.14 (6.16)	10.43 (6.49)	5.54 (4.66 to 6.43) <.001	.71 (.64 to .76)	−.08 (−1.02 to .86) .869	.01 (.00 to .09)	−.037 (−1.35 to .62) .465	.06 (.00 to .19)
Aggressive behaviour	22.58 (6.54)	14.10 (8.62)	13.52 (8.32)	14.01 (7.79)	8.57 (7.37 to 9.77) <.001	.75 (.70 to .79)	−.09 (−1.24 to 1.06) .875	.01 (.00 to .08)	.48 (−.73 to 1.70) .433	.06 (.00 to .19)
Other problems	7.43 (3.31)	5.49 (3.26)	5.48 (3.34)	5.43 (3.53)	1.94 (1.47 to 2.41) <.001	.55 (.46 to .63)	.01 (−.43 to .44) .976	.00 (.00 to .02)	.06 (−.44 to .56) .817	.02 (.00 to .12)
Internalising problems	21.48 (11.63)	14.35 (10.57)	13.66 (10.15)	13.78 (10.21)	7.13 (5.68 to 8.59) <.001	.62 (.53 to .68)	.69 (−.56 to 1.93) .276	.09 (.00 to .22)	.57 (−.89 to 2.03) .443	.06 (.00 to .19)

(continued)

Table 1 *(continued)*

	Time n = 153, raw scores: Mean (SD)				Estimated mean differences					
					Baseline to post-treatment		Post-treatment to 6-month follow-up		Post-treatment to 12-month follow-up	
CBCL	Baseline	Post-treatment	6-month follow-up	12-month follow-up	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90%CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)
Externalising problems	38.18 (10.13)	24.07 (12.30)	24.22 (13.35)	23.86 (13.75)	14.11 (12.19 to 16.03) <.001	.76 (.71 to .80)	−.14 (−2.08 to 1.79) .883	.01 (.00 to .08)	.21 (−1.85 to 2.27) .841	.02 (.00 to .10)
Total problems	92.54 (28.09)	61.02 (30.65)	60.24 (30.79)	59.01 (30.76)	31.52 (26.91 to 36.12) <.001	.74 (.68 to .78)	.78 (−3.41 to 4.96) .714	.03 (.00 to .15)	2.01 (−2.58 to 6.61) .388	.07 (.00 to .20)

TABLE 2
Parenting Styles & Dimensions Questionnaire (PSDQ) Outcome Measure: Summary of Long-term Results for MST Research Participants

	Time n = 146, Mean (SD)				Estimated mean differences					
					Baseline to post-treatment		Post-treatment to 6-month follow-up		Post-treatment to 12-month follow-up	
Parenting style	Baseline	Post-treatment	6-month follow-up	12-month follow-up	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)
Authoritative parenting style										
Connection	3.91 (.67)	4.12 (.66)	4.08 (.62)	4.03 (.67)	−.21 (−.35 to −.08) <.001	.33 (.20 to .44)	.04 (−.07 to .15) 1.000	.08 (.00 to .21)	.09 (−.03 to .21) .212	.16 (.01 to .29)
Regulation	3.72 (.84)	4.06 (.71)	4.02 (.70)	3.89 (.70)	−.35 (−.54 to −.16) <.001	.37 (.25 to .47)	.04 (−.08 to .16) 1.000	.07 (.00 to .20)	.17 (.04 to .30) .003	.28 (.15 to .40)
Autonomy	3.37 (.72)	3.59 (.71)	3.58 (.69)	3.51 (.73)	−.22 (−.37 to −.06) .001	.30 (.17 to .41)	.01 (−.12 to .15) 1.000	.02 (.00 to .12)	.08 (−.07 to .23) .967	.12 (.00 to .24)

(continued)

Table 2 *(continued)*

	Time n = 146, Mean (SD)				Estimated mean differences					
					Baseline to post-treatment		Post-treatment to 6-month follow-up		Post-treatment to 12-month follow-up	
Parenting style	Baseline	Post-treatment	6-month follow-up	12-month follow-up	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)
Total	3.66 (.61)	3.90 (.64)	3.90 (.59)	3.81 (.59)	−.24 (−.38 to −.10) <.001	.35 (.23 to .46)	.01 (−.10 to .12) 1.000	.02 (.00 to .11)	.94 (−.03 to .21) .218	.17 (.03 to .30)
Authoritarian parenting style										
Physical coercion	1.53 (.53)	1.29 (.43)	1.23 (.38)	1.26 (.49)	.24 (.15 to .33) <.001	.50 (.40 to .59)	.05 (−.03 to .14) .612	.14 (.00 to .26)	.03 (−.09 to .14) 1.000	.05 (.00 to .18)
Verbal hostility	2.62 (.71)	2.02 (.60)	2.11 (.63)	2.10 (.59)	.60 (.44 to .76) <.001	.63 (.54 to .69)	−.09 (−.23 to .05) .461	.15 (.00 to .27)	−.08 (−.21 to .06) .715	.13 (.00 to .26)
Non-reasoning/ punitive	2.03 (.70)	1.83 (.60)	1.76 (.52)	1.78 (.60)	.21 (.04 to .37) .006	.27 (.14 to .38)	.06 (−.06 to .19) 1.000	.11 (.00 to .24)	.05 (−.10 to .19) 1.000	.07 (.00 to .20)

(continued)

Table 2 *(continued)*

	Time n = 146, Mean (SD)				Estimated mean differences					
					Baseline to post-treatment		Post-treatment to 6-month follow-up		Post-treatment to 12-month follow-up	
Parenting style	Baseline	Post-treatment	6-month follow-up	12-month follow-up	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)
Total	2.06 (.48)	1.71 (.42)	1.70 (.38)	1.71 (.40)	.35 (.24 to .45) <.001	.60 (.51 to .67)	.01 (−.07 to .09) 1.000	.03 (.00 to .16)	.01 (−.08 to .09) 1.000	.01 (.00 to .08)
Permissive parenting style										
Indulgent	2.92 (.84)	2.10 (.64)	2.24 (.69)	2.34 (.74)	.82 (.62 to 1.01) <.001	.68 (.61 to .74)	−.14 (−.27 to −.01) .030	0.23 (.10 to .35)	−.24 (−.40 to −.09) <.001	.32 (.20 to .43)

TABLE 3
Parental Depression Anxiety and Stress Scale 21 (DASS-21) Outcome Measure: Summary of Long-term Results for MST Research Participants

	Time n = 121, raw score: Mean (SD)				Estimated mean differences					
					Baseline to post-treatment		Post-treatment to 6-month follow-up		Post-treatment to 12-month follow-up	
DASS-21	Baseline	Post-treatment	6-month follow-up	12-month follow-up	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)	Mean difference (95% CI) *P*	Effect size *r* (90% CI)
Depression	15.74 (10.57)	7.87 (8.65)	9.45 (9.76)	9.06 (8.93)	7.88 (5.11 to 10.64) <.001	.57 (.46 to .65)	−1.58 (−3.68 to .53) .279	.18 (.02 to .31)	−1.19 (−3.36 to .98) .807	.13 (.00 to .27)
Anxiety	9.95 (9.93)	5.27 (7.16)	7.00 (9.49)	5.67 (7.85)	4.68 (2.62 to 6.73) <.001	.49 (.36 to .58)	−1.73 (−3.36 to −.09) .032	.25 (.10 to .38)	−.40 (−1.92 to 1.13) 1.000	.06 (.00 to .2)
Stress	20.39 (10.46)	11.55 (8.53)	13.69 (9.79)	12.81 (8.96)	8.84 (6.39 to 11.28) <.001	.66 (.57 to .72)	−2.14 (−4.19 to −.09) .035	.25 (.10 to .38)	−1.26 (−3.32 to .81) .633	.15 (.00 to .28)

goal of helping this population is developing a strong working alliance with parents (Adamson et al., 2015), and the program usually excels in achieving this critical stage.

The MST intervention is very client-focused, typically working on therapy goals identified by the family, works with the family in their own home, works at times that the family choose, and provides 24/7 telephone support to parents. This client-centric intervention enables engagement with many hard-to-reach families, and ultimately empowers families to manage their problems more effectively and appropriately by themselves. This highly flexible, client-centred, positive engagement results in high levels of engagement with vulnerable populations, and very low intervention drop-out rates that are exceptional for a client population that are typically service-wary.

Case Vignette

One family to whom the program was referred some years ago by police demonstrates the pragmatic and flexible nature of this intervention and the ability to engage families in exceptional circumstances. The referral was for a rural family comprised of a mother in her late 30s and two sons aged 12 and 13 years of age. The family was living in a car and tent after fleeing severe domestic violence, and had recently come to the attention of local police because the boys were seen engaging in solvent use.

The female clinician initially engaged with the mother on an immediate level by purchasing food and convincing her she was able to improve the family's living circumstances and outlook. It later emerged the boys were threatening the mother for money that they used to purchase the solvents. After several weeks developing trust and engagement, the clinician convinced the mother to enter a local refuge then enabled her to obtain a debit card to help her resume sole control of her pension. The mother was supported to find an appropriate school for the boys, and encouraged to determine how and where the boys were accessing inhalants and solvents. The mother followed her boys and discovered the boys were harassing other boys for money that they used to purchase solvents from two local hardware stores. The clinician then helped the mother explore options to address this and the mother decided to confront the hardware store staff about selling solvents to her boys. This action was followed by the mother placing posters in the local shopping centre featuring pictures of her boys with a request that others not sell or buy solvents/inhalants for these two boys. The clinician convinced the mother to trust the local police to only speak with her boys about solvent use and harassing others for money. When the case was closed the boys were reliably attending school and had completely ceased substance use. The mother had made contact with relatives living in the city, and was seeking more permanent accommodation closer to where the extended family lived. When contacted 6 months later the family had settled more permanently near relatives and the two boys were engaged in school and local sports, and had not resumed abusing solvents or other substances.

This client-centred approach also results in consistently very high client satisfaction ratings. The results of this preliminary longitudinal study demonstrates the MST intervention is an effective intervention for addressing the wide range of factors identified as contributing to complex behavioural problems in high-risk Australian youth. This intervention can likely play an important role in Australia to reduce the cost and rates of youth violence, aggression, substance abuse, early school dropout, and juvenile detention. Much can be learned by all therapists about engaging high-risk families by understanding the surrounding ecology of the family. Visiting homes or living

situations, and the local school and community tells the therapist much about the tensions involved in the daily lives of their clients. It becomes easier to understand the frustrations of their situation, and how these can so easily manifest in aggression or inappropriate actions by any member of the family, or even within the local community. The initial engagement and trust with families is often enabled by the MST therapist helping the family at a quite basic level to bear with their everyday difficulties, like helping the parent pay a bill. The small cost of this immediate pragmatic help for the family is quickly outweighed against the potential benefits and cost savings to the society by diverting a young person from a life of dysfunction, crime, and damage to others.

Effective early intervention with these high-risk youth is cost-effective because the intervention helps reduce adult rates of chronic unemployment, aggression, and violence including domestic violence, substance abuse, mental illness, anti-social and criminal behaviour, detention and incarceration. However, successful intervention with families having violent and disruptive children is more important than just being cost-effective. Helping disadvantaged families successfully raise their children enables improved life conditions for many, and enables all involved to manifest better potential in ourselves.

Limitations of study

These study results must be viewed in consideration of some methodological limitations. The absence of a control or comparison group makes it difficult to exclude the possible confounding impact of natural variations over time. Despite this limitation, previous studies indicated that the positive changes in caregivers' parenting skills and mental health were one of the strongest implications for positive treatment outcomes (Bywater et al., 2009; van Loon, Granic, & Engels, 2011; Sadock & Sadock, 2007). The results from this study showed that the MST intervention successfully improved caregivers' parenting skills and mental health. These significant improvements in caregiver skill efficacy and mental health functioning were maintained at both 6-month and 12-month follow-up periods. This supports the contention that the treatment may have contributed to positive effects on youth behaviours by improvement in caregivers' functioning and mental health. These findings also support the importance of the family system as contributors to youth antisocial behaviour, along with their crucial role in the success of the MST intervention.

A more rigorous and comprehensive evaluation is required by future study. A control group, multi-informant measures, and longer follow-up period would be important to confirm the current preliminary results. Further evaluation may include a descriptive analysis of family historical and environmental factors, analysis of comparison groups including cost–benefit analyses and hierarchical regression analysis of factors contributing to the successful implementation of the MST intervention.

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